AMENDMENTS TO DRAWINGS

The attached one (1) replacement sheet of drawings includes changes to Fig. 1. This sheet, which includes Fig. 1, replaces the original sheet including Fig. 1. In Figure 1, previously unlabeled elements 104, 108 and 110 have been labeled.

Attachment: One (1) Replacement sheet

APPLICANT: KNEE, Michael et al.
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REMARKS

The present response is intended to be fully responsive to all points of objection and rejection raised by the Examiner and is believed to place the application in condition for allowance. Applicants assert that the present invention is new, non-obvious and useful. Prompt consideration and allowance of the claims is respectfully requested.

OBJECTIONS TO DRAWINGS

In the Office Action, the Examiner objected to Figure 1 under 37 C.F.R. § 1.84(n) as depicting a block diagram without "readily identifiable" descriptors of each block. In response, one (1) replacement sheet of drawings containing an amended version of Figure 1 has been provided.

OBJECTION TO SPECIFICATION

In the Office Action, the Examiner objected to the title of the invention as being too general to reveal the real invention to which the claims are directed. The title of the specification has been amended to "System and Method for Video Processing by Image Segmentation".

STATUS OF CLAIMS

Claims 1-33 are pending in this application and are rejected.

Claims 1, 9 and 12 have been amended herein. Claims 13-20, 22, 23 and 33 have been canceled herein.

CLAIM OBJECTIONS

In the Office Action, the Examiner objected to claim 3 under 37 CFR 1.75(d)(1) on the ground that there is no clear support or antecedent basis for the concept of "linear functions mapping" in the description. The specification has been amended herein at page 2, line 11, to provide clear support. No new matter has been added, as the new text that has been added to the specification is in accordance with claim 3 as originally filed.

The Examiner also raised a similar objection against claim 33. However, claim 33 has been canceled without prejudice.

CLAIM REJECTIONS

In the Office Action, the Examiner rejected claims 1-8 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Castagno et al. (IEEE Vol. 8, No. 5, Sep. 1998, pages 562-571) and Park et al. (U.S. Patent No. 6,535,632 B1). Applicants respectfully traverse this rejection.

Applicants note that claim 1 has been amended herein to include the subject matter contained in claims 22 and 23, which have now been canceled herein. Claim 1 now recites, *inter alia*, that the distance in segmentation vector space includes a displaced frame difference calculated by applying a motion vector from the segment to the pixel. Applicants respectfully assert that these amendments render moot the Examiner's objections to claims 1-8.

It is most convenient here to consider the objections raised by the Examiner against claim 23. This claim, together with claims 32 and 33, was rejected to under 35 U.S.C. § 103(a) as being unpatentable over the combination of Castagno and Park as applied to claim 1 and further in view of Bierling et al. (U.S. Patent No. 4,771,331). In his reasoning, the Examiner correctly notes, that the Castagno and Park combination does not explicitly teach the displaced frame differences as one of the feature values. However, the Examiner states that it would have been obvious to include the segmentation system of the Castagno and Park combination with displaced frame difference (DFD) as taught by Bierling.

Bierling discloses a motion compensating field interpolation method. An algorithm is provided for identifying motion or displacement vectors and that algorithm operates through minimizing the displaced frame difference. Accordingly, while Bierling et al. does contain an explicit disclosure of use of the displaced frame difference, this use is strictly in relation to the method of calculation of motion or displacement vectors.

In the interest of clarity, the term "motion vector" will hereafter be used to mean "motion or displacement vector", and the term "DFD" will be used to mean "displaced frame difference".

The Examiner has implied that Bierling, Castagno and Park relate to the same field of endeavor. While it can be admitted that all three references relate to video or image processing, each disclosure must be viewed within the context of the specific issue or problem in the broad field of video or imaging processing that is addressed by that disclosure. Castagno is directed to the issue of video segmentation and is not, as perhaps suggested by the Examiner, to the field of reconstruction of television sequences. Bierling is in the field of reconstruction television sequences in the sense that it provides for motion compensating field interpolation, and teaches that an improved algorithm for producing motion vectors should reduce the DFD to (or close to) zero. There is nothing in Bierling or in Castagno or in Park that comes close to suggesting that a DFD might be used as a distance in segmentation vector space in an image segmentation process.

If one skilled in the art reading Castagno were directed to the disclosure of Bierling, he would see no parallel between the problem of video segmentation and the problem of motion compensating field interpolation. The Examiner's suggestion that the reader of Castagno might wish to "further reduce(s) the jerkiness in the motion compensating interpolated sequence" bears no relation to the problems addressed by Castagno; Castagno seeks to segment a video sequence into objects and has no interest in reducing the jerkiness of interpolation. If directed more specifically to the disclosure in Bierling of the use of DFD, one skilled in the art reading Castagno (or of the combination of Castagno and Park) would see use of the DFD in an improved algorithm for calculation motion or displacement vectors. Thus, there is no common sense combination of these references.

Moreover, even if that reader chose to make use of the disclosure in Bierling, the result of a combination of Castagno, Park and Bierling would be improved motion vectors. It is important to note that Bierling is always striving to reduce the DFD to zero. A non-zero DFD is in the context of Bierling merely an indication that the correct motion vector has not yet been achieved. To take the DFD and to use it as one of the features defining a distance in

segmentation vector space would, in the context of Castagno, Park and Bierling, be a technical nonsense. Thus, even a combination of these references would not render the invention of amended claim 1 obvious.

The present inventor has taken the counter-intuitive and inventive step of recognizing that using a DFD (previously regarded as an error to be reduced to zero) in defining a distance in segmentation vector space can improve the segmentation process. As noted at page 10, lines 5-9 of the application as filed:

> Motion vectors give rise to the possibility of an additional component in the distance metric, based on the error in the pixel domain when the motion vector is applied to a picture. This displaced frame difference can be incorporated into the distance metric with appropriate scaling. The result is a segmentation that takes into account the fidelity of the motion compensated prediction.

Using a DFD, previously regarded as an error signal, as a feature value alongside the previously used values of spatial coordinates and picture values is a step neither known nor rendered obvious in the cited documents. It is a step which runs counter both to the suggestions in Castagno for appropriate feature values and to the suggestion in Bierling to improve a motion vector by reducing DFD to zero.

For the foregoing reasons, Applicants respectfully assert that claims 1-8 distinguish patentably from the cited art and respectfully request that the rejection be withdrawn.

Claims 5 and 16 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Castagno and Park and in further view of Aggarwal et al. (U.S. Patent No. 6,758,706 B2). Applicants note that claim 16 has been canceled herein. With respect to claim 5, Applicants respectfully assert that claim 5 distinguishes patentably from the cited art at least for the reasons given above in relation to claim 1 and respectfully request that the rejection be withdrawn.

Claims 9-11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Castagno and Park and further in view of Price et al. As amended herein, claim 9 is dependent on claim 1. Applicants respectfully assert that claims 9-11 distinguish

patentably from the cited art at least for the reasons given above in relation to claim 1 and respectfully request that the rejection be withdrawn.

Claims 12-20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Castagno and Park (for claim 16 further in view of Aggarwal et al). Applicants note that claims 13-20 have been canceled herein. Regarding claim 12 as amended herein, Applicants note that claim 12 is dependent on claim 1. Applicants respectfully assert that amended claim 12 distinguishes patentably from the cited prior art at least for the reasons given above in relation to claim 1 and respectfully request that the rejection be withdrawn.

Claim 21 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Castagno and Park further in view of Globus et al. (U.S. Patent No. 4,078,860). This rejection is respectfully traversed.

Applicants note that the "toroidal canvas" referred to in claim 21, and as described in the corresponding descriptive portion of the specification is a virtual canvas, and there is no intent to change the manner in which the image will subsequently be displayed. The toroidal canvas is a mathematical construct in segmentation vector space equivalent to stitching the left edge to the right edge and the top edge to the bottom edge. This, as explained at page 8, lines 7-12 of the application as filed, is a solution to the problem of the disappearance or reappearance of objects.

It should be recognized that one skille din the art who takes Castagno and Park in combination would see no relevance whatsoever in the cycloramic image projection system of Globus, despite its use of a "toroidal" lens, such that such a combination is against common sense. First, Globus does not disclose a toroidal canvas. Second, the reader of Castagno is not interested in producing an image in a completely circular mode. Furthermore, even if the reader of Castagno were directed to employ the disclosure of Globus, the result would be the use of a toroidal lens in the downstream display of an image which had at some point been segmented into objects as disclosed by Castagno and Park. The notion that the disclosure of a

toroidal lens in Globus should render obvious in the combination of Castagno and Park a segmentation vector space in a toroidal canvas, is – respectfully - fanciful.
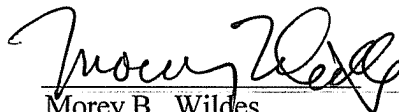
In the Office Action, the Examiner rejected claims 24-31 rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Castagno and Park. The Examiner also rejected claim 28 based upon the combination of Castagno and Park and further in view of Penn. Applicants respectfully assert that these claims distinguish patentably from the cited art, at least for the reasons given above in relation to claim 1.

In the Office Action, the Examiner rejected claims 23, 32 and 33 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Castagno and Park, further in view Bierling. Applicants note that claims 23 and 33 have been canceled herein and their limitations discussed above with respect to amended independent claim 1. Regarding claim 32, Applicants respectfully assert that claim 32 is distinguished patentably from the cited art at least for the reason given above in relation to claim 1.

If the Examiner has any questions or comments as to this response, the undersigned may be contacted at the address and telephone number below.

Please charge any fees associated with this paper to deposit account No. 50-3355.

Respectfully submitted,

Morey B. Wildes
Attorney/Agent for Applicant(s)
Registration No. 36,968

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Pearl Cohen Zedek Latzer, LLP
1500 Broadway, 12th Floor
New York, New York 10036
Tel: (646) 878-0800
Fax: (646) 878-0801